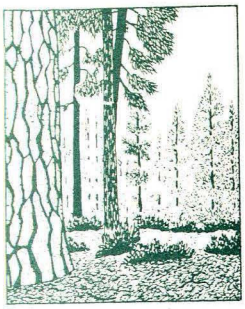

FOREST RESEARCH NOTES

CALIFORNIA FOREST AND RANGE EXPERIMENT STATION
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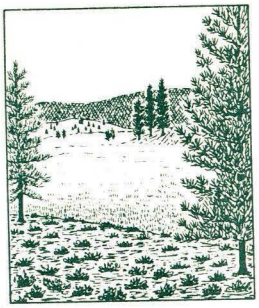

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SALVAGE LOGGING MAY DESTROY DOUGLAS-FIR REPRODUCTION

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In the future the United States will need all the softwoods our forest lands can grow. 1/ Yet thousands of acres in northwestern California are idle because they have not been restocked with adequate conifer reproduction after logging or burning. Scanty seedlings are not necessarily the result of negligence. Forest managers realize that reproduction often is hard to establish. Obviously, if advance reproduction is already established before cutting, every possible precaution to preserve the young trees should accompany the logging operation.

Logging damage to reproduction can be reduced by careful preparation of a logging plan and adherence to that plan. 2/ But how extensively is Douglas-fir reproduction destroyed by conventional salvage logging methods on ground typical of northwestern California? To answer this question observations were recorded on a small part of the Three Creeks Burn, Humboldt County.

The fire killed almost all the standing timber on the study area in August 1951. Later that year heavy seedfall occurred from undamaged timber nearby. An excellent stocking of Douglas-fir seedlings resulted.

1/ Crafts, Edward C. Timber Resource Review. Chapter I. Timber resources for America's future. A summary of the timber resource review. U. S. Forest Service. 129 pp., illus. September 1955.

2/ Cosens, Richard D. Reducing logging damage. Calif. Forest and Range Expt. Sta. Res. Note 82. 10 pp., illus. 1952.

Conditions Before Logging

In 1954, before salvage logging, 2 line transects were surveyed and 103 milacre quadrats were examined. Douglas-fir seedlings were distributed on the area at the rate of 1,981 per acre, and 71 percent of the milacres were stocked with at least one seedling--enough seedlings and good enough distribution to create a satisfactory forest. The ground, a 40-percent, east-facing slope, was 95 percent covered with vegetation (fig. 1). Components of the ground cover, in approximate order of importance based upon area occupied were:

Western bracken	(Pteridium aquilinum pubescens)
Tanoak	(Lithocarpus densiflorus)
Modest whipplea	(Whipplea modesta)
Snowbrush ceanothus	(Ceanothus velutinus)
Bushmans burnweed	(Erechtites arguta)
Salal	(Gaultheria shallon)
Pacific madrone	(Arbutus menziesii)
Torrey peavine	(Lathyrus torreyi)
Cascades mahonia	(Mahonia nervosa)
Western trumpet honeysuckle	(Lonicera ciliosa)
California rose	(Rosa californica)
Golden chinkapin	(Castanopsis chrysophylla)
Grapeleaf California dewberry	(Rubus ursinus vitifolius)
Deerbrush ceanothus	(Ceanothus integerrimus)
Sedge	(Carex)

Although the ground was almost completely covered with competing plants, the Douglas-fir seedlings were growing well. Some seedlings were 18 inches tall and several had grown more than 11 inches in 1953. Enough seedlings were growing sufficiently fast to dominate the area eventually.

Logging removed an average of 41,800 board-feet (net) per acre. The operator, who used typical tractor logging methods, did not know that the transects existed and, therefore, was not influenced by them.

Figure 1.--Fire-killed timber and heavy ground cover before salvage logging. Three years after the fire sporophores of the pouch fungus (arrows) are numerous. Buck Butte Sale, Three Creeks Burn, Six Rivers National Forest, 1954.

Figure 2.--Ground condition in 1955 after logging fire-killed timber on the area shown in Figure 1. A large part of the ground has been disturbed severely.

Conditions After Logging

After logging only 25 percent of the milacre quadrats remained stocked with Douglas-fir seedlings. The number of seedlings was reduced to 417 per acre. All quadrats had been disturbed by logging to some degree. Two percent were only lightly disturbed, but 34 percent were moderately disturbed and 64 percent were severely disturbed (fig. 2). Stocking on milacre plots was: Lightly disturbed, 100 percent; moderately disturbed, 51 percent; severely disturbed, 9 percent. Salvage logging, therefore, destroyed about 80 percent of the original seedlings, and the severity of seedling destruction was related to the degree of logging disturbance.

Reducing Damage to Reproduction

Can destruction of conifer seedlings be reduced under conditions similar to those found on the Buck Butte Sale? The most obvious measure is to salvage fire-killed timber immediately. Two advantages accrue. First, logging is completed before new reproduction is established, and conifer seedlings which stock the area soon after logging will have the best chance to compete with other vegetation which is also just beginning to regenerate. Second, early salvage logging prevents growth of the pouch fungus (Polyporous volvatus (Pk.), which destroys the sapwood and weakens trees, causing higher losses from felling breakage and rot.

Another way to protect reproduction is by careful logging. This demands proper training and supervision of logging crews. At first thought the possibilities for modifying logging practices to protect small seedlings appear unpromising, but attention to several seemingly minor details can save appreciable reproduction. Some of these details are:

1. Felling trees in proper directions.

2. Clean limbing before skidding.

3. Scouting out and planning each turn of the tractor.

4. Setting chokers without rolling logs with dozer blades or tractor tracks.

5. Setting chokers to roll logs away from reproduction.

6. Pulling tractor cables from the drum to the log when warranted.

7. "Breaking-out" logs in line with the original lay of the tree.

When you find good reproduction, protect it. Try to save the high costs of artificial regeneration.